

QUALITY ASSURANCE

The goals of quality assurance are to assure that the AML remediation projects are designed in a controlled manner; and designed and constructed according to sound engineering standards, quality practices, and technical specifications. Quality assurance begins with conceptual design and continues through preliminary design, definitive design, and construction. It comprises both quality engineering and quality control (inspection).

DESIGN

Quality assurance during design includes review of materials of construction and installed equipment for economics, compatibility with other components, and maintainability.

Continuous review of the design is required to ensure the project can be constructed as designed using the most efficient techniques. The cost of construction is greatly dependent on the design work. Constructability includes consideration of interference between project components and engineering disciplines, compatibility of specifications with changing seasons, and integration of different contractors on the job site.

The most important aspect of quality assurance during design is continuous surveillance of the design. Periodic design reviews are seldom, except in very small projects, adequate to assure a quality product. Continuous surveillance assists in reducing critical comments during design reviews, and reduces the total design effort by reducing time spent on change proposals and corrections.

To be acceptable, a quality assurance program for design should have a "yes" answer to the following questions:

YES NO

1. Is design surveillance continuous and are there reviews after each design phase (i.e., conceptual to definitive)?
2. Are performance requirements specified?
3. Are responsibilities and lines of communication defined?
4. Are errors documented and corrective actions defined?

5. Does verification provide for qualified and independent review (immediate supervisors generally are not considered independent)?
6. Are design changes subject to the same review and verification as the original design?
7. Have procedures been established to determine that applicable regulations, codes, standards, design bases, acceptance/rejection criteria are included in procurement documents?
8. Do procurement documents require contractors to provide an acceptable quality assurance program?
9. Are procedures established that describe how obsolete or superseded documents are replaced by revisions?

CONSTRUCTION

The project manager must assure that the contractor establishes and follows a plan for certifying shop drawings, material testing, and work completion. The project manager must also assure that the architect-engineer, construction manager, and government staff act in a timely manner on approval of submittals. An effective program includes quality assurance reports from contractors and quality control inspectors together with procedures for reviewing the reports and taking prompt effective action.

The quality assurance program must be adequately staffed with qualified inspectors. In addition, continual checks must be made to assure that all of the quality assurance functions are being performed and prompt corrective actions are taken.

All quality assurance reports, test results, and inspections should be under the control of the NPS.

To be acceptable, a quality assurance program for construction should have a "yes" answer to the following questions:

YES NO

1. Does the program describe what, when, where, and how inspections are performed?
2. Are the organizational responsibilities for inspection described?

YES NO

3. Do inspection procedures provide acceptance and rejection criteria including receiving inspections for purchased materials, equipment, and services?
4. Do procedures identify hold points beyond which work may not proceed until inspected?
5. Are inspectors qualified?
6. Are inspection results documented and evaluated, and their acceptability determined by a responsible person?
7. Do test procedures provide instructions, methods of analysis, methods of documentation, acceptability of results, corrective action, and review by responsible individual?
8. Have procedures been established to calibrate test equipment according to recognized standards?
9. Have controls been established to identify and track samples?
10. Are procedures in place establishing an effective corrective action program?